



US009138142B2

(12) **United States Patent**
Christie et al.

(10) **Patent No.:** **US 9,138,142 B2**
(45) **Date of Patent:** **Sep. 22, 2015**

(54) **MASKED INTRAOCULAR DEVICES**

(75) Inventors: **Bruce A. Christie**, Upland, CA (US);
Thomas A. Silvestrini, Alamo, CA
(US); **Kevin F. Hahnen**, Center Ossipee,
NH (US)

(73) Assignee: **AcuFocus, Inc.**, Irvine, CA (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 1253 days.

(21) Appl. No.: **11/417,667**

(22) Filed: **May 3, 2006**

(65) **Prior Publication Data**

US 2006/0271177 A1 Nov. 30, 2006

Related U.S. Application Data

(63) Continuation of application No. 10/854,033, filed on
May 26, 2004, now Pat. No. 7,628,810.

(60) Provisional application No. 60/473,824, filed on May
28, 2003, provisional application No. 60/479,129,
filed on Jun. 17, 2003.

(51) **Int. Cl.**

A61B 3/15 (2006.01)
A61F 2/16 (2006.01)
A61F 2/14 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC . **A61B 3/152** (2013.01); **A61F 2/14** (2013.01);
A61F 2/147 (2013.01); **A61F 2/1613**
(2013.01); **G02C 7/04** (2013.01); **G02C 7/165**
(2013.01); **A61F 2002/1697** (2013.01); **A61F**
2002/1699 (2015.04); **A61F 2250/0023**
(2013.01); **A61F 2250/0067** (2013.01); **A61F**
2250/0098 (2013.01)

(58) **Field of Classification Search**

CPC G02C 7/165
USPC 623/5.13, 6.14, 6.17
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

564,518 A 7/1896 Heilborn
1,206,132 A 11/1916 Otte

(Continued)

FOREIGN PATENT DOCUMENTS

AU 2004201751 5/2004
CN 1875895 12/2006

(Continued)

OTHER PUBLICATIONS

U.S. Appl. No. 60/397,906, filed on Jun. 23, 2002.*

(Continued)

Primary Examiner — David H Willse

(74) *Attorney, Agent, or Firm* — Knobbe Martens Olson &
Bear LLP

(57)

ABSTRACT

An ophthalmic device that includes a mask configured to be
implanted posterior of the cornea. The mask is configured to
increase the depth of focus of the patient. The mask includes
an aperture configured to transmit along an optical axis sub-
stantially all incident light and a substantially opaque portion
surrounding at least a portion of the aperture. The ophthalmic
device can further include a plurality of light transmission
structures configured to allow some light to pass through the
substantially opaque portion. The light transmission struc-
tures are configured to minimize generation of visible arti-
facts due to the transmission of light through the light trans-
mission structures.

43 Claims, 31 Drawing Sheets

